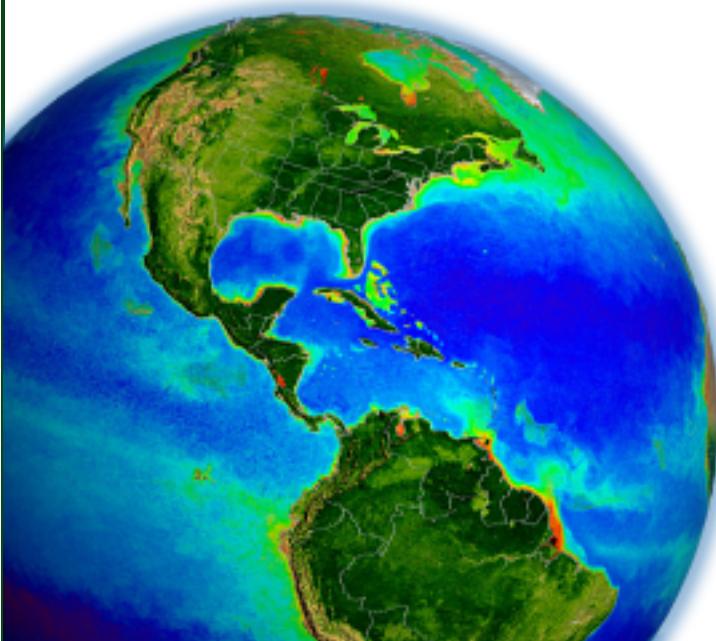


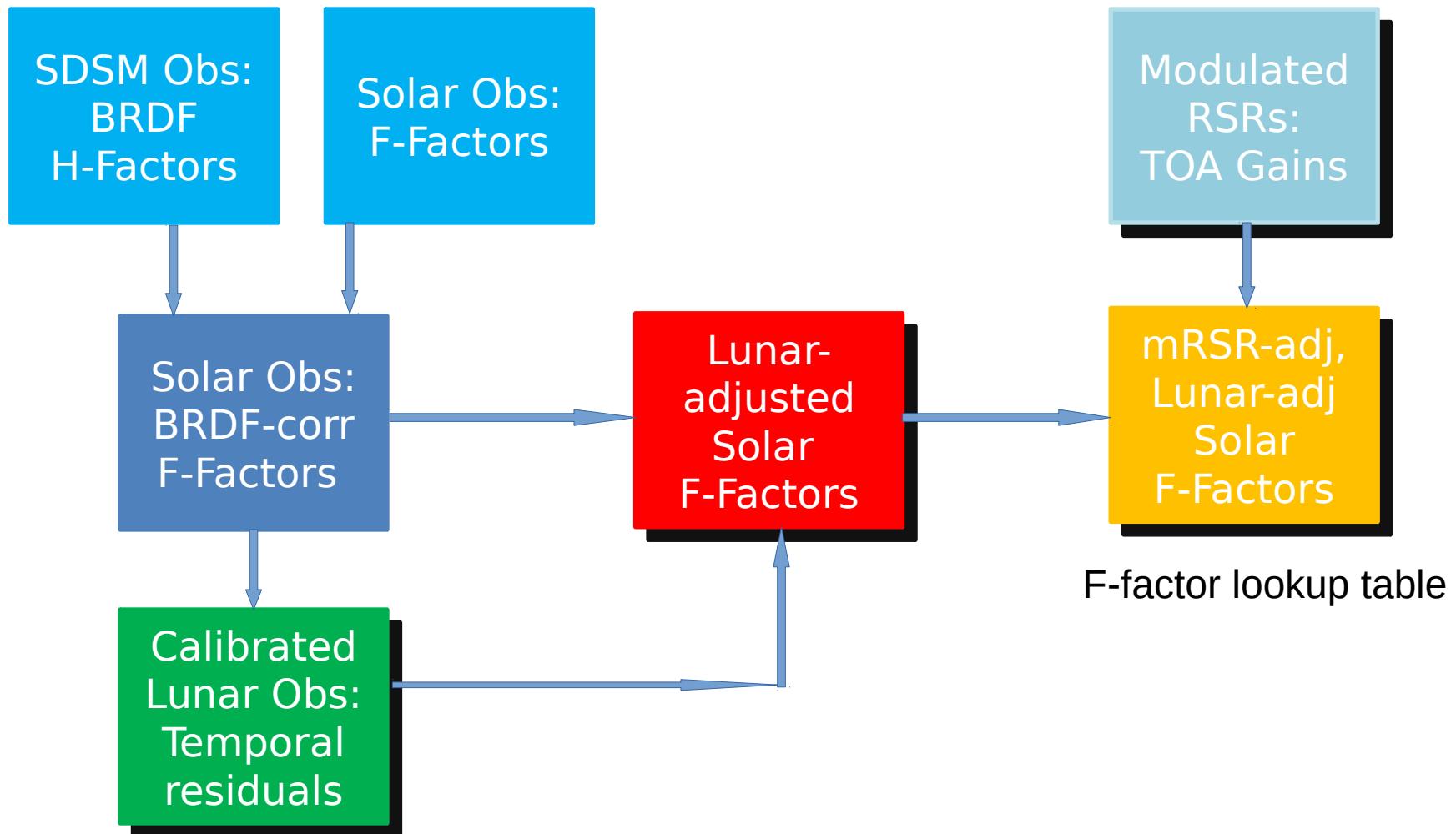
NASA OBPG Updates to the On-Orbit Calibration of SNPP VIIRS for Ocean Color Applications



October 19, 2018

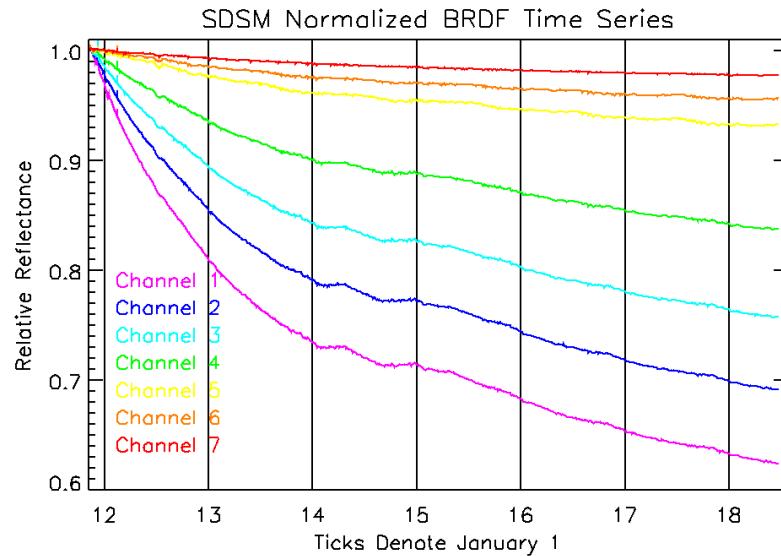
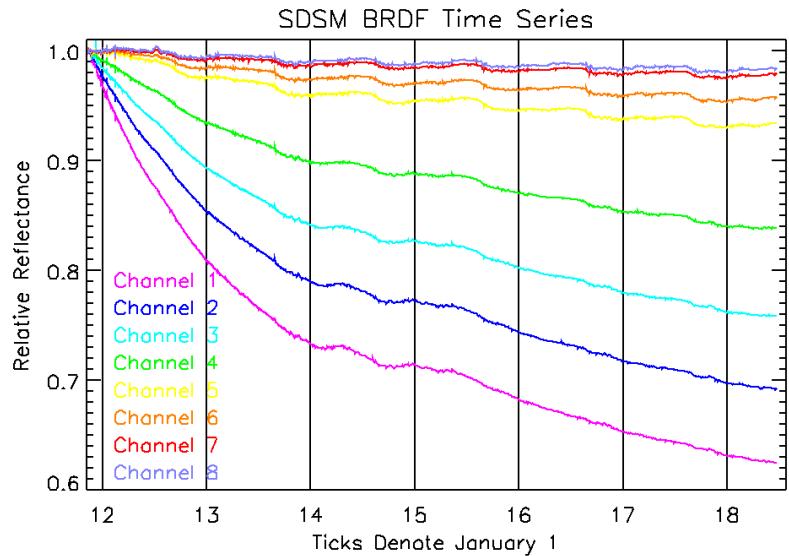
Gene Eplee, SAIC

SNPP VIIRS On-Orbit Calibration Data Flow

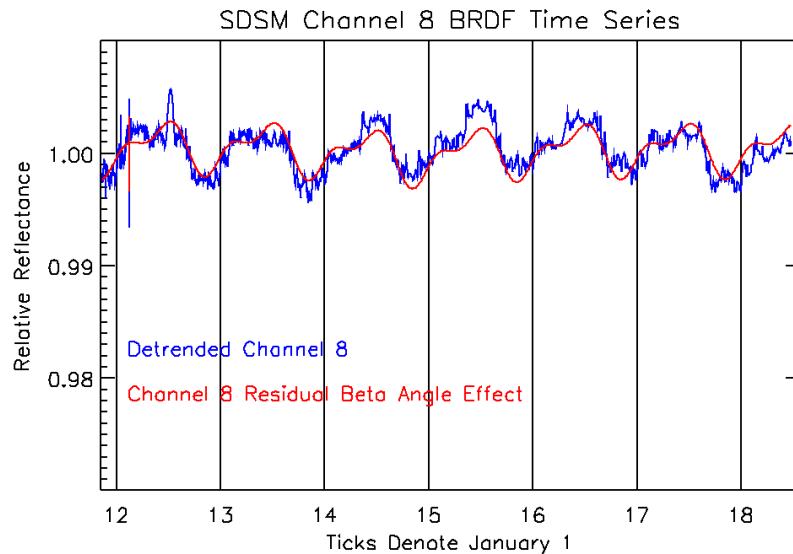
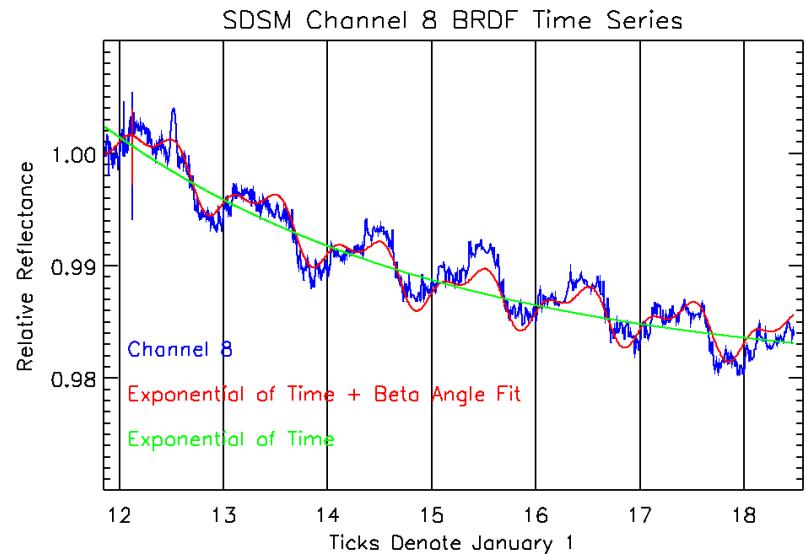


SDSM Data Processing

SDSM H-factors

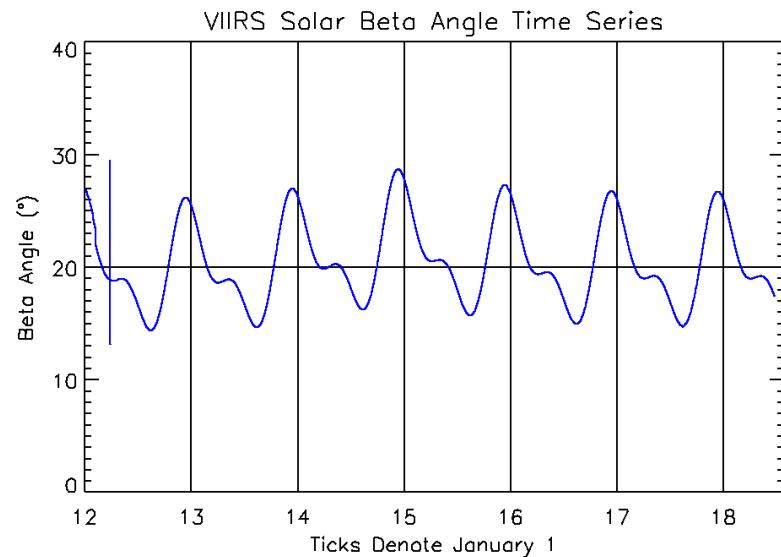
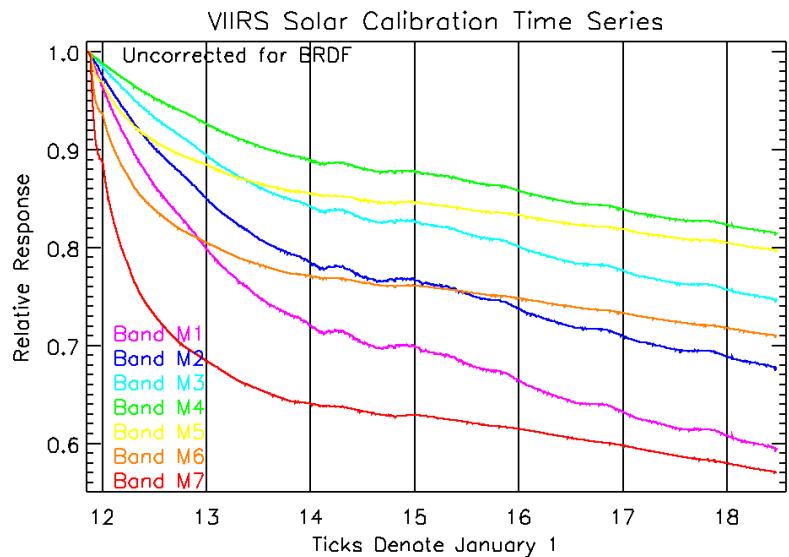


C8 detrending is offset by the lunar comparison.

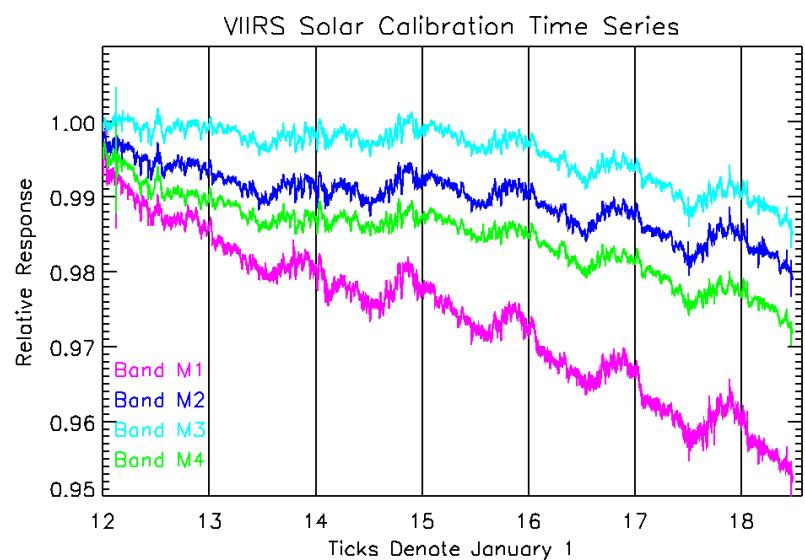


Solar Data Processing

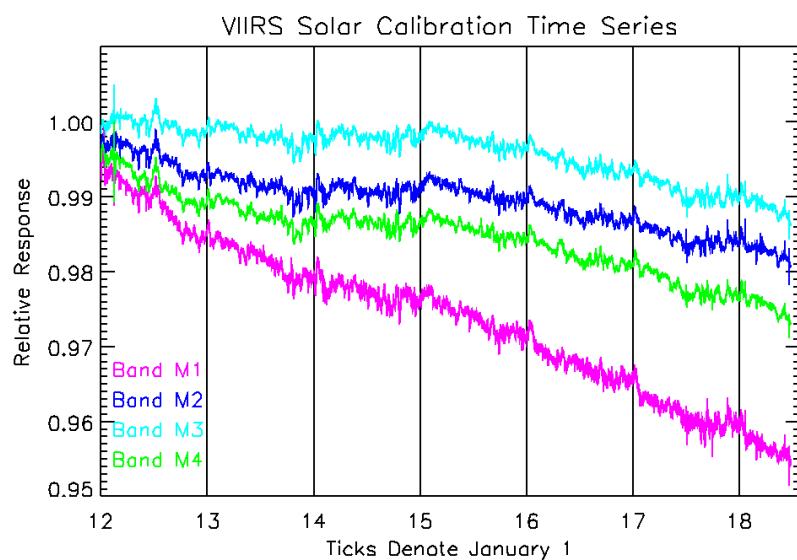
Solar F-factors



BRDF correction applied

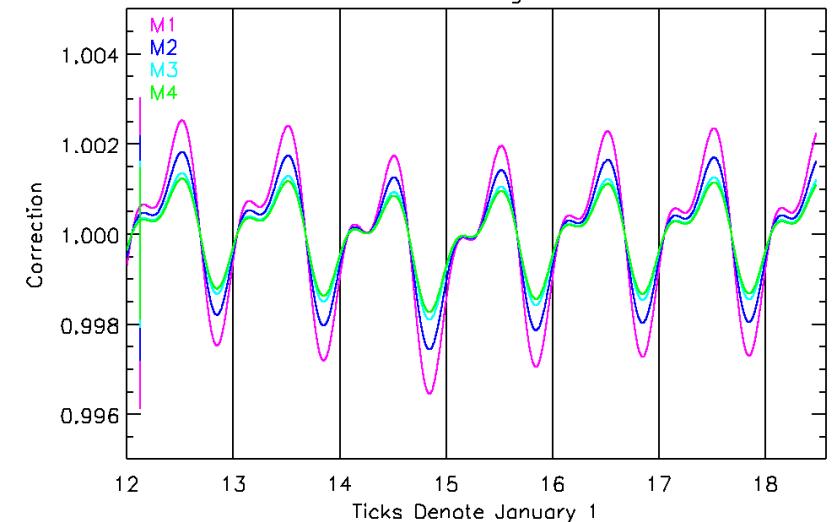


Beta Angle correction applied

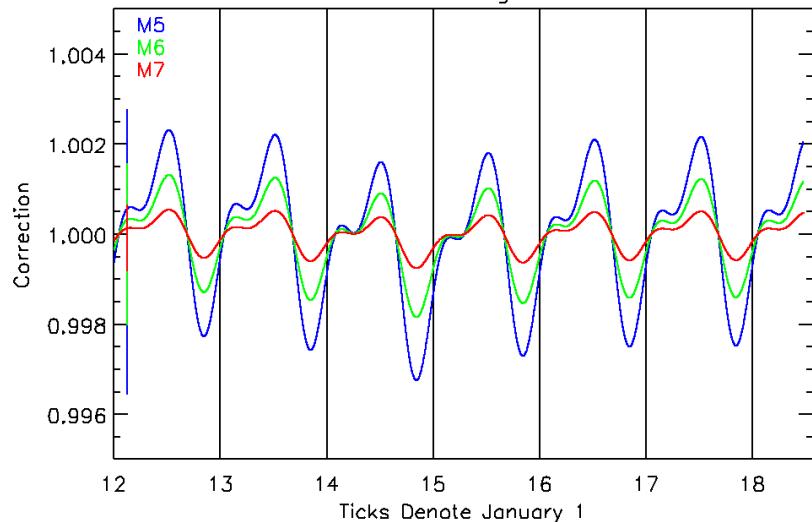


Solar Beta-Angle Corrections

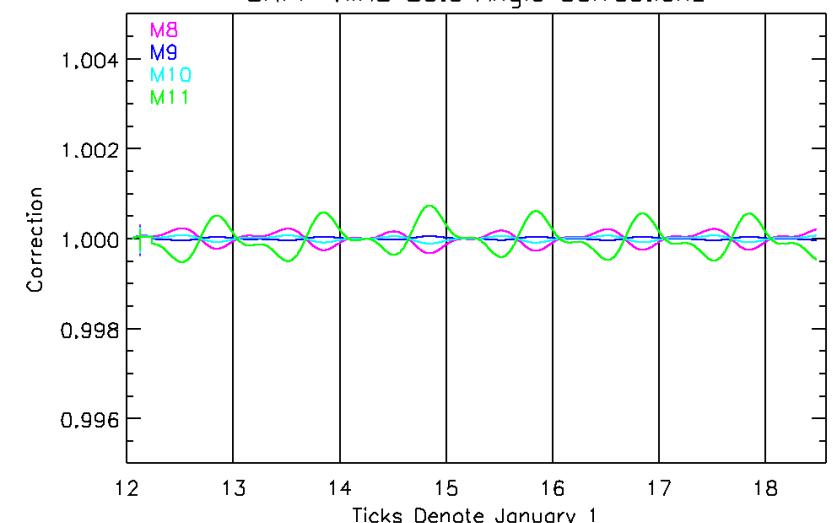
SNPP VIIRS Beta Angle Corrections



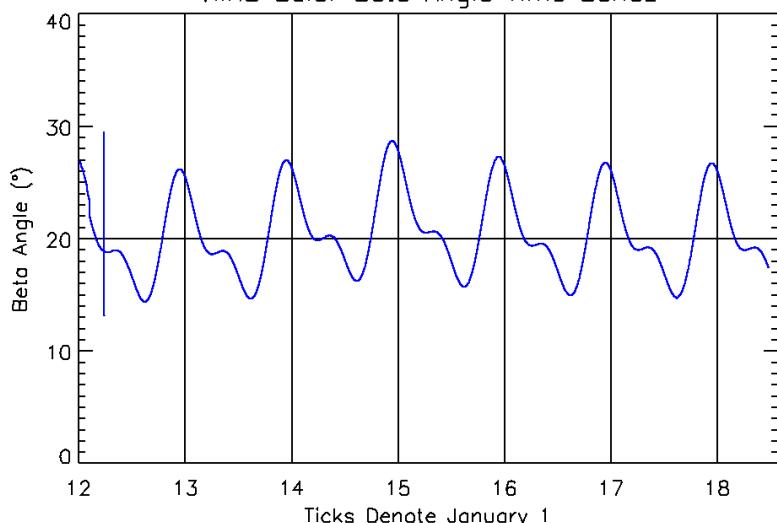
SNPP VIIRS Beta Angle Corrections



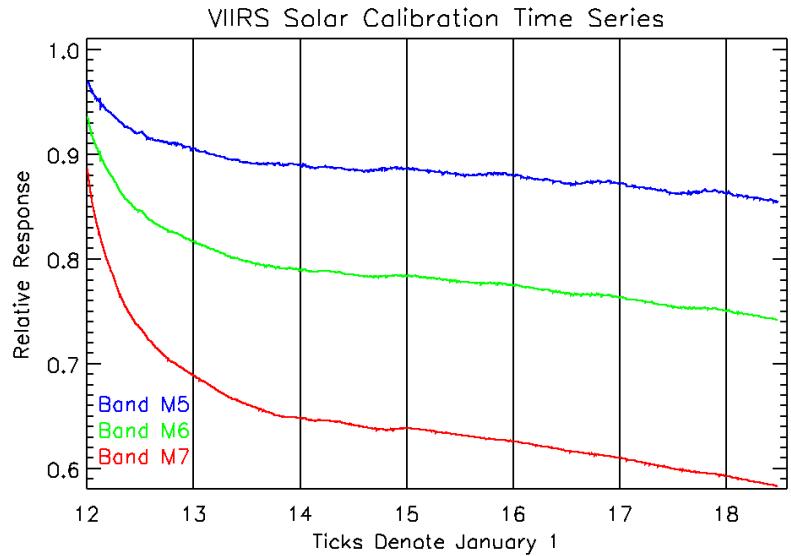
SNPP VIIRS Beta Angle Corrections



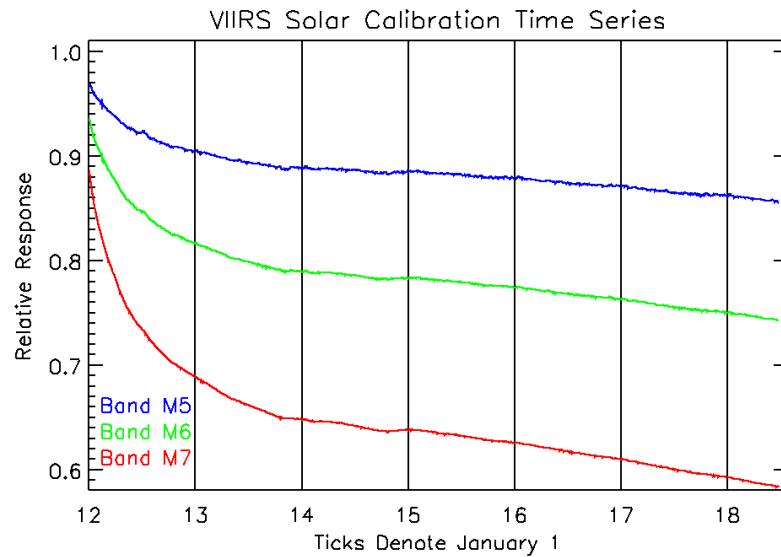
VIIRS Solar Beta Angle Time Series



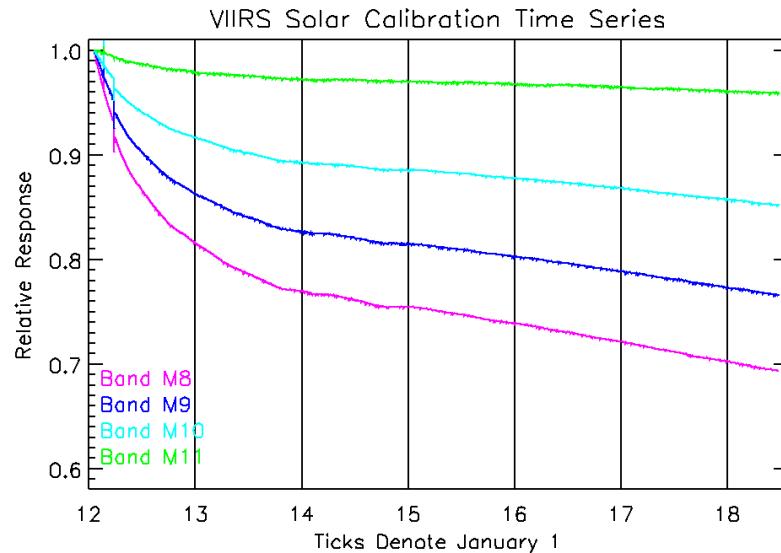
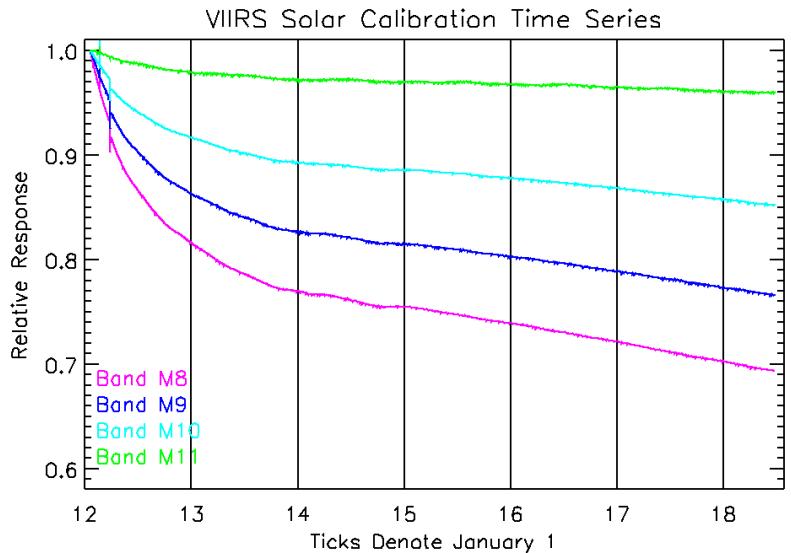
Solar F-factors



BRDF correction applied to M5-M7

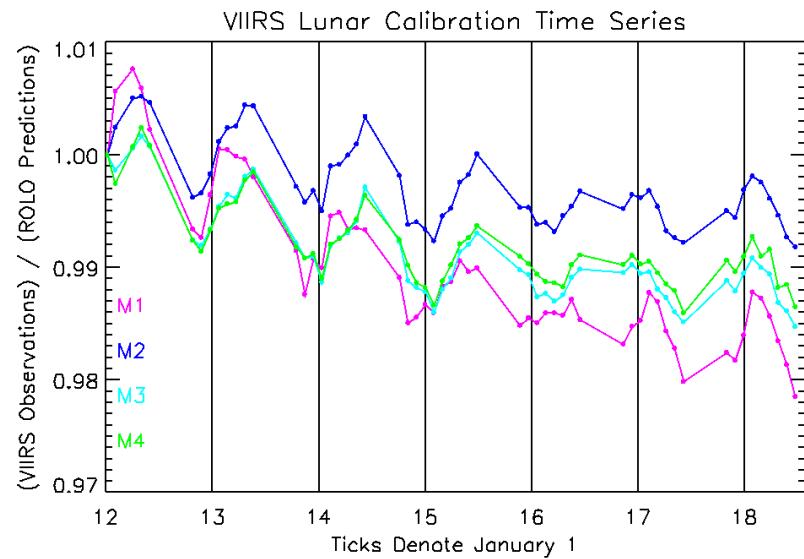


Beta Angle correction applied



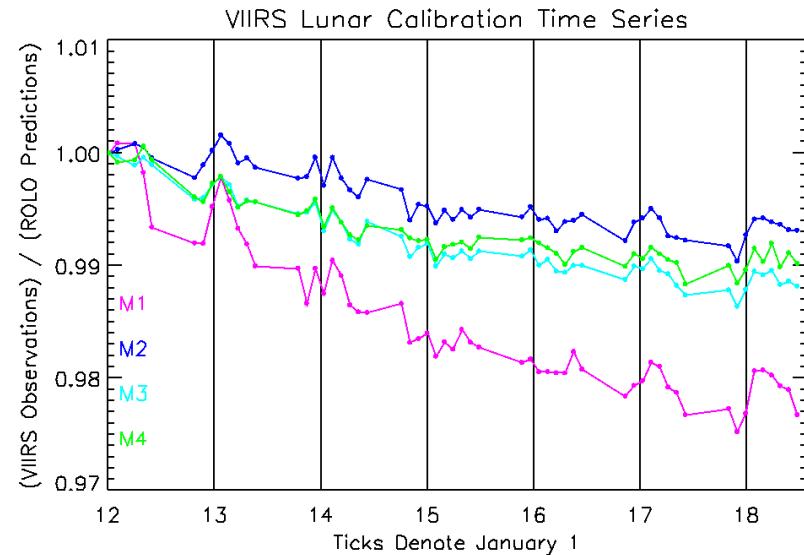
Lunar Data Processing

Lunar Time Series

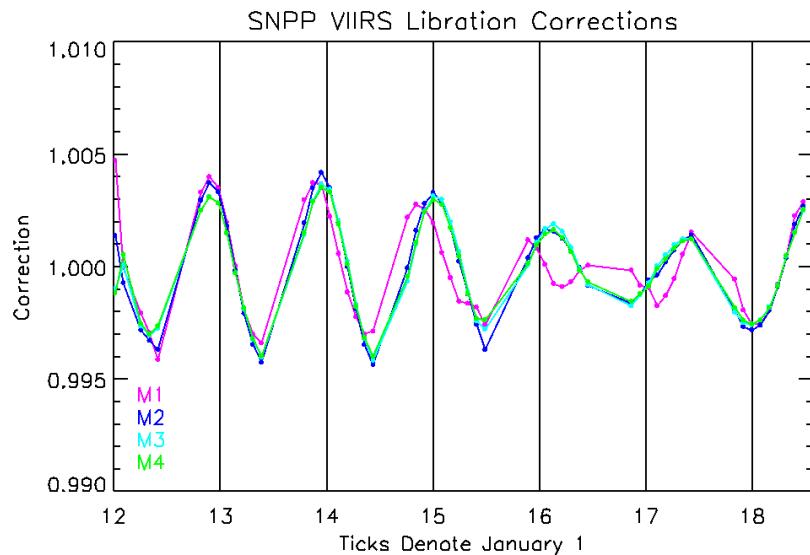


Lunar observations with solar F-factors applied

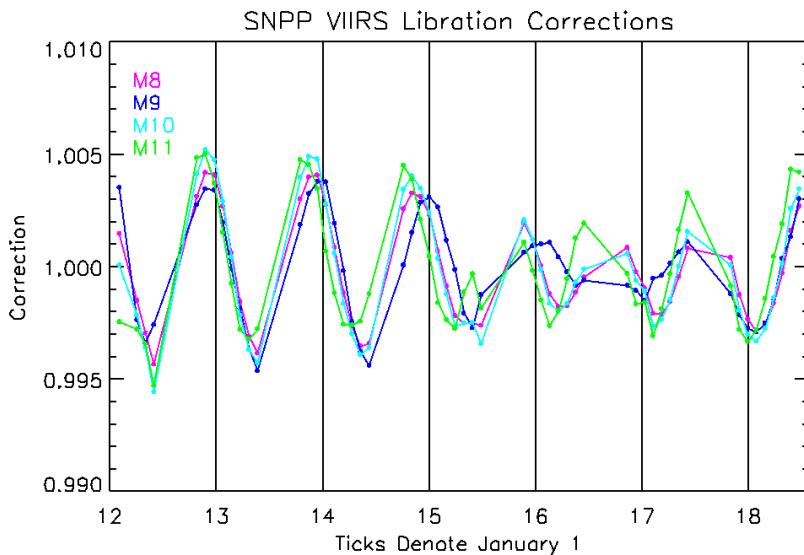
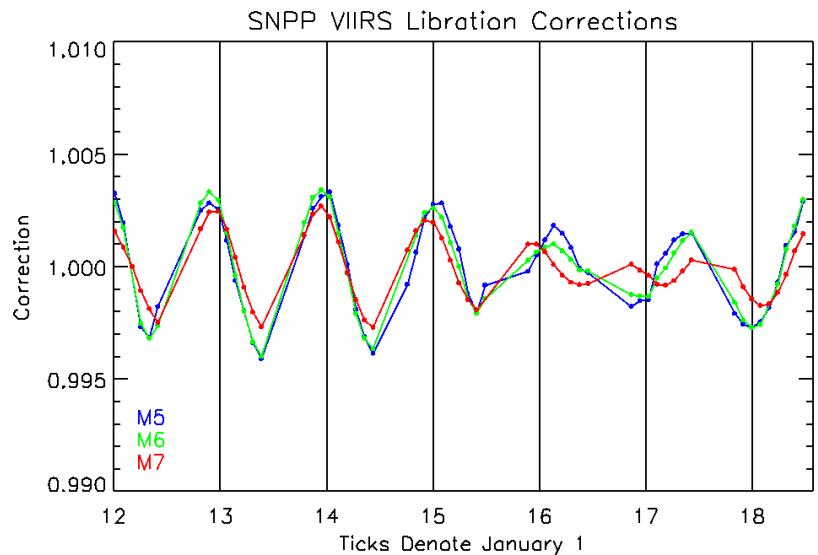
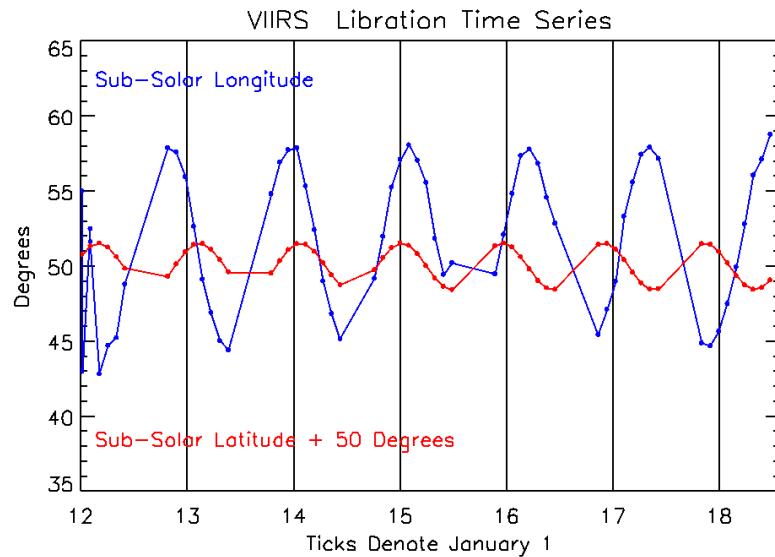
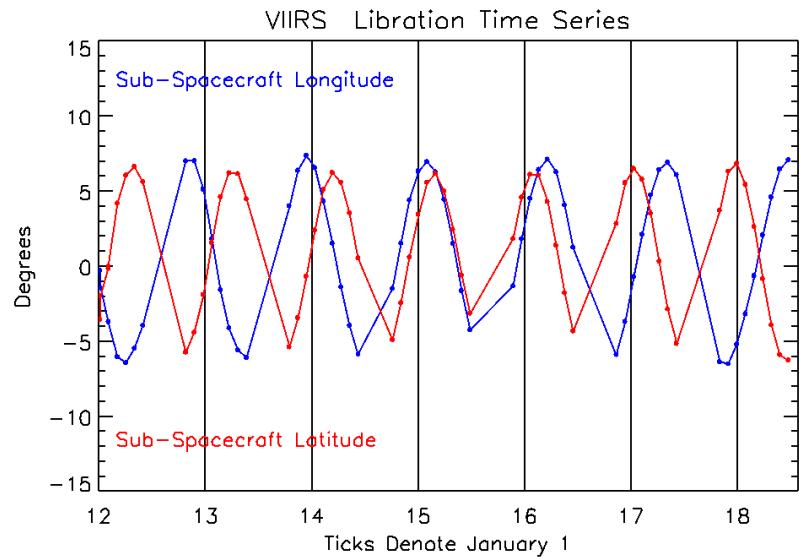
Temporal trends arise from errors in H-factor BRDF correction



Libration corrections applied

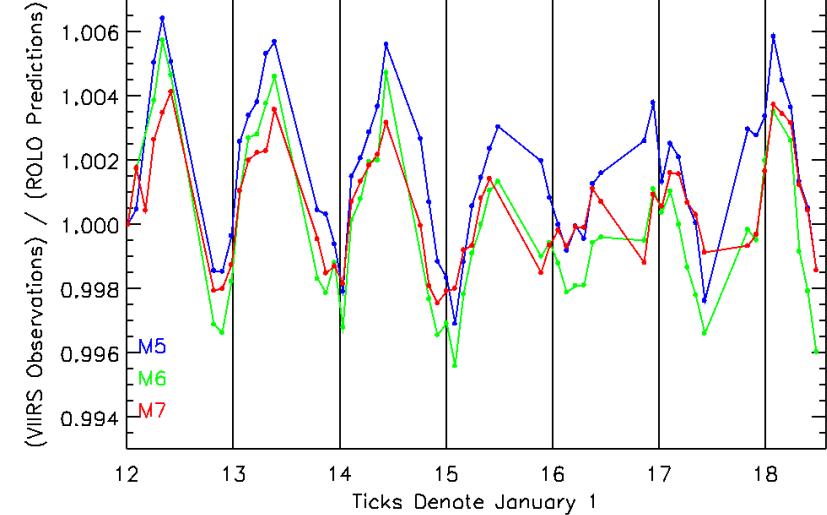


Lunar Librations

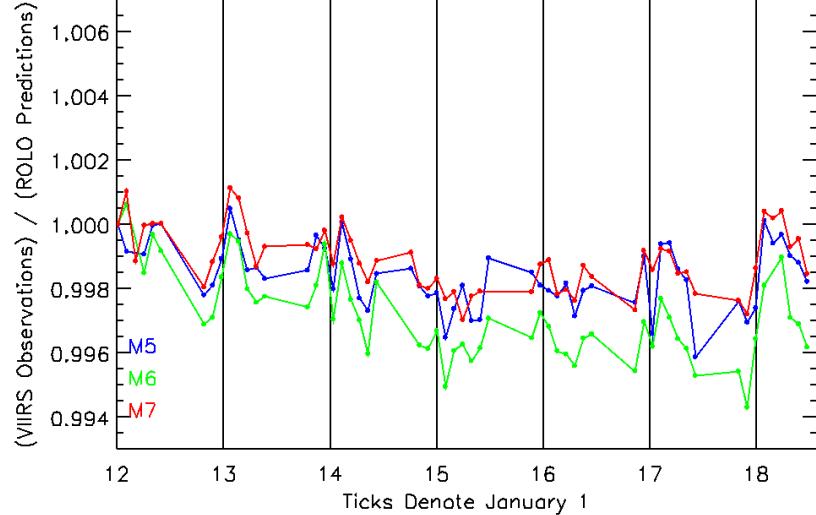


Lunar Time Series

VIIRS Lunar Calibration Time Series

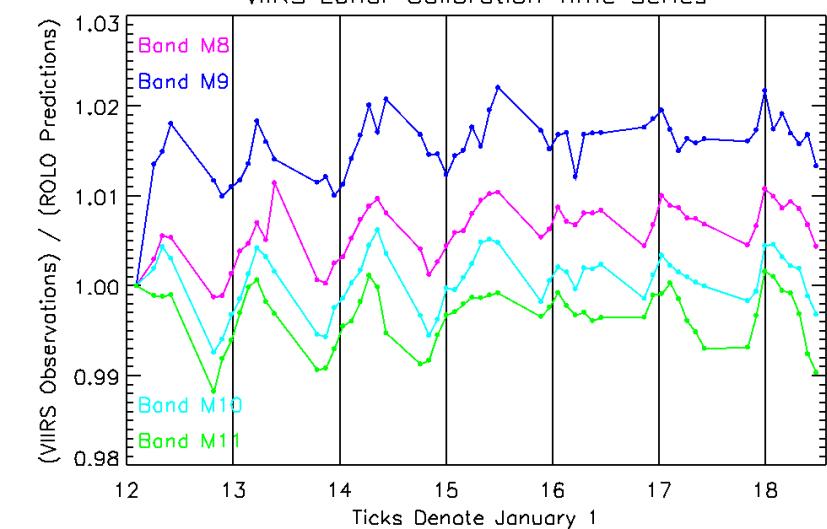


VIIRS Lunar Calibration Time Series

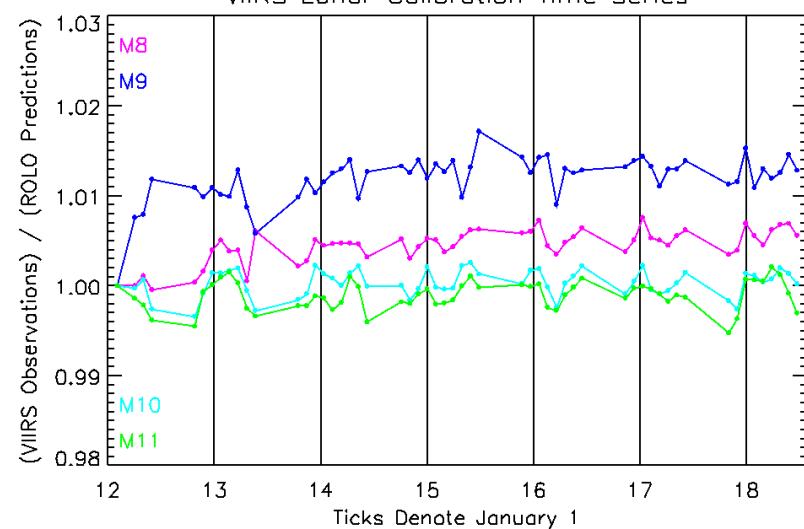


Libration corrections applied

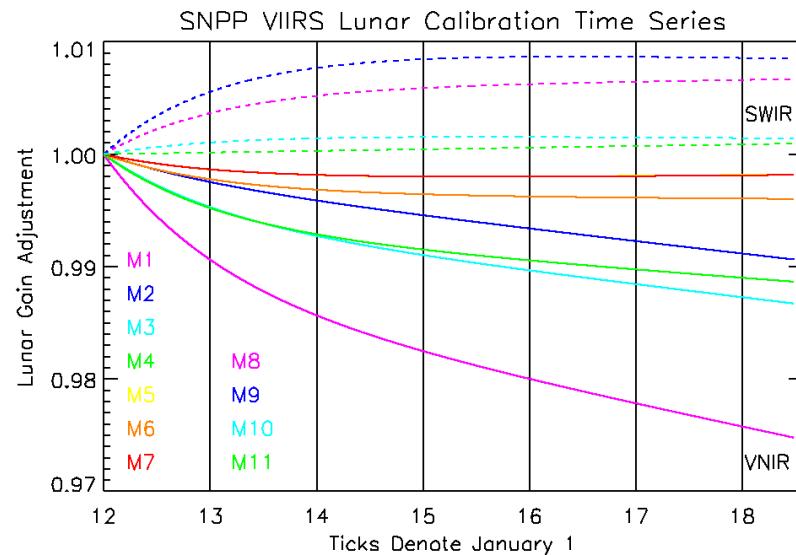
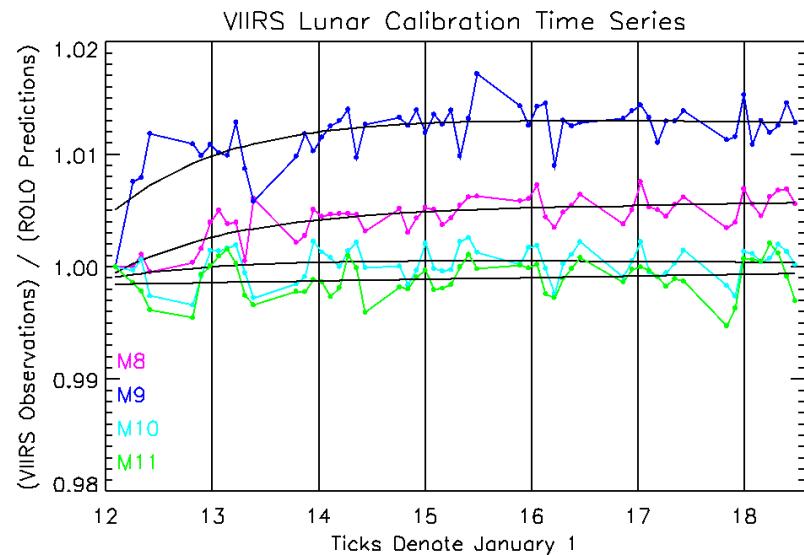
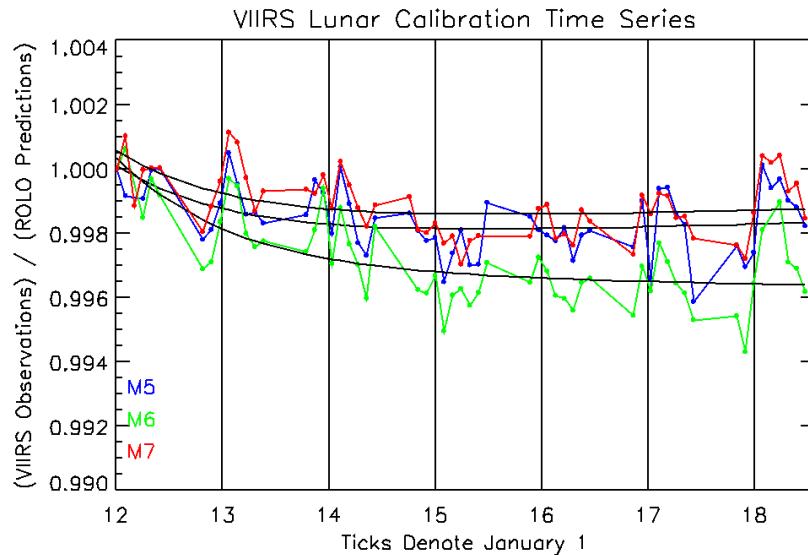
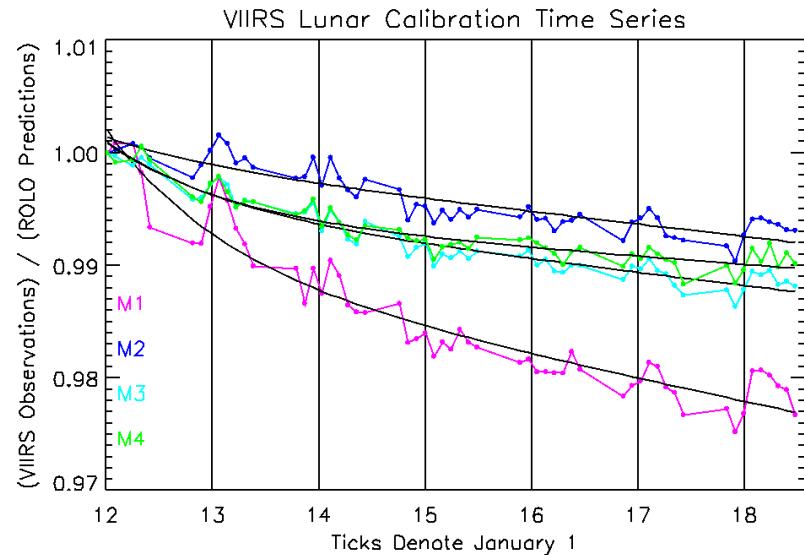
VIIRS Lunar Calibration Time Series



VIIRS Lunar Calibration Time Series

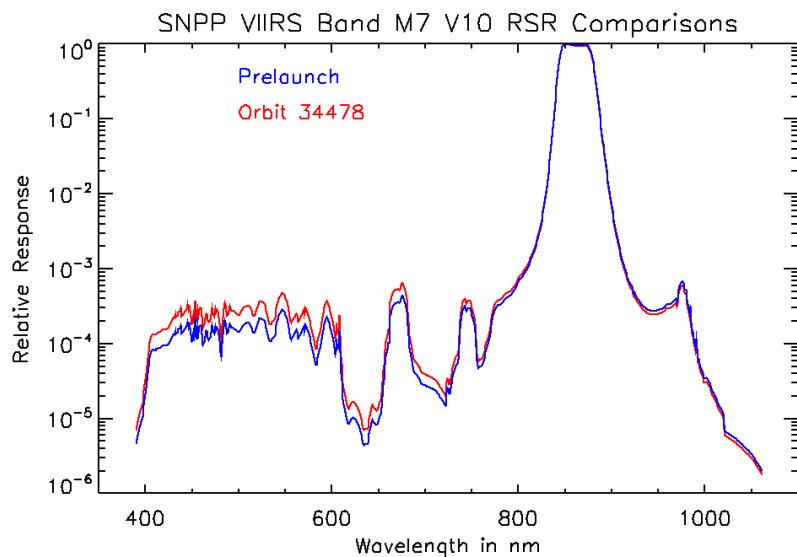
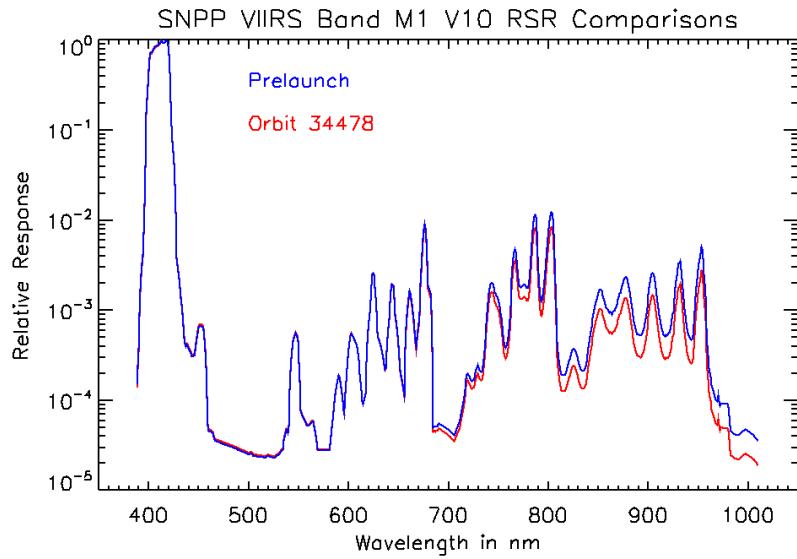
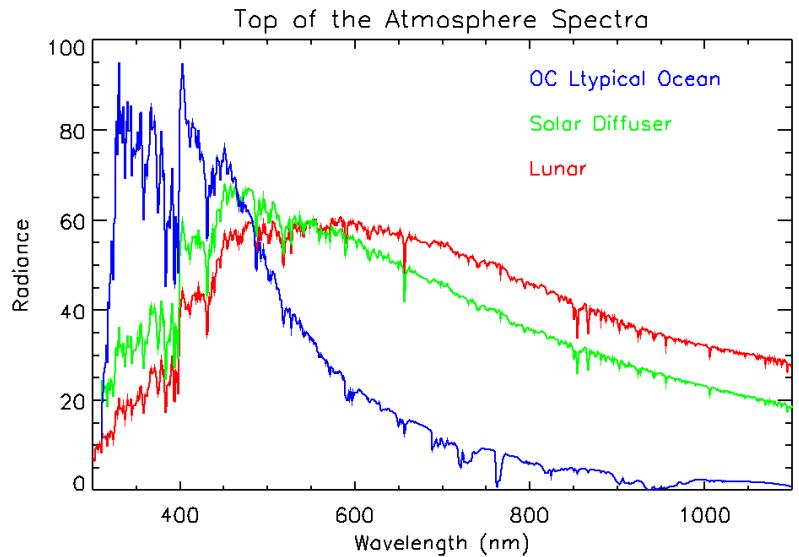


Lunar Temporal Residuals



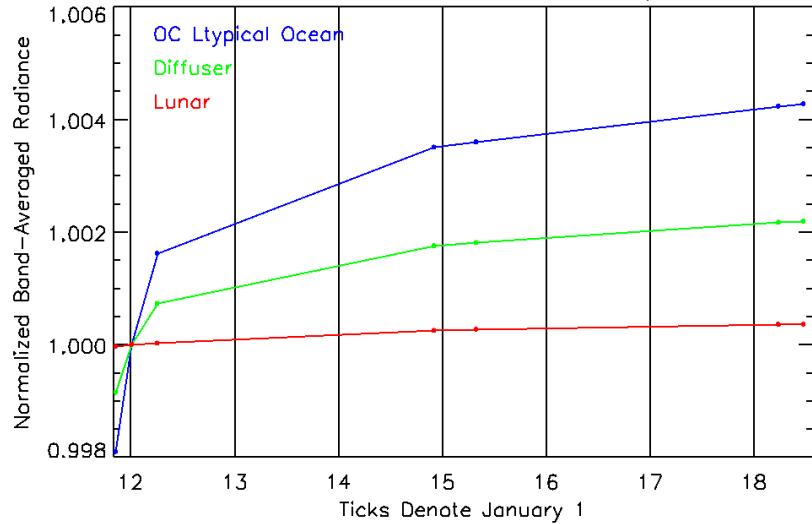
Modulated RSR Data Processing

Modulated RSRs

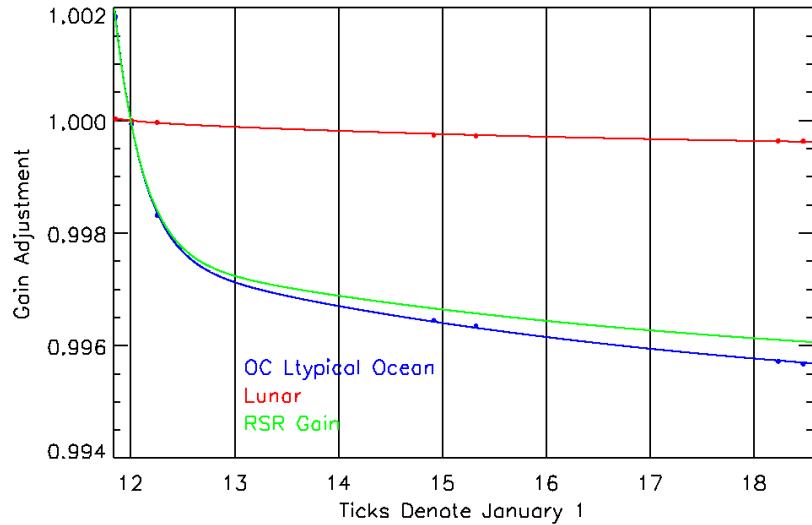


Modulated RSRs

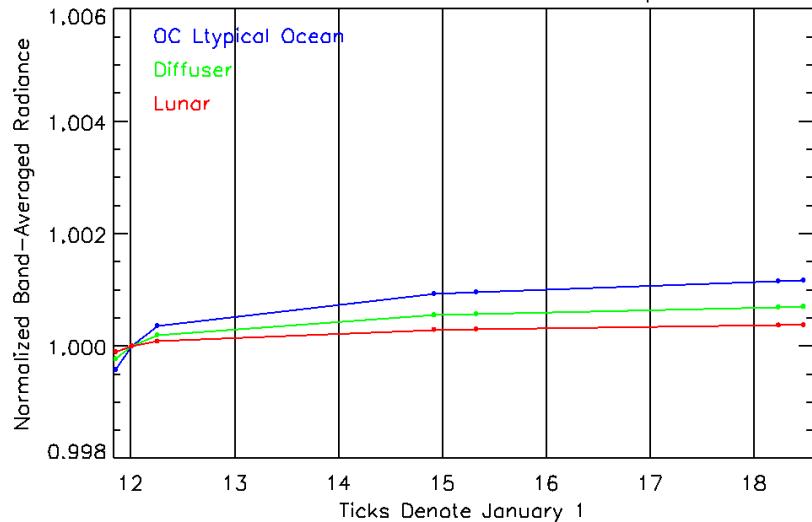
SNPP VIIRS Band M1 V10 RSR Comparisons



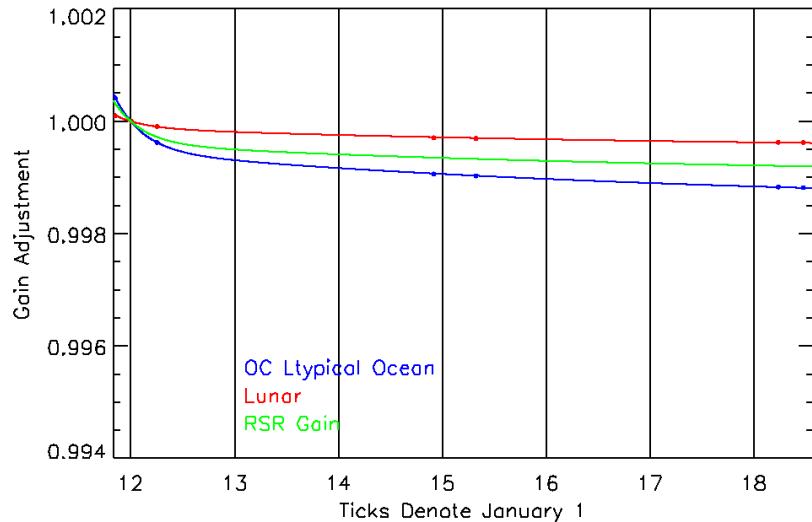
SNPP VIIRS Band M1 V10 RSR Ocean Gains



SNPP VIIRS Band M2 V10 RSR Comparisons

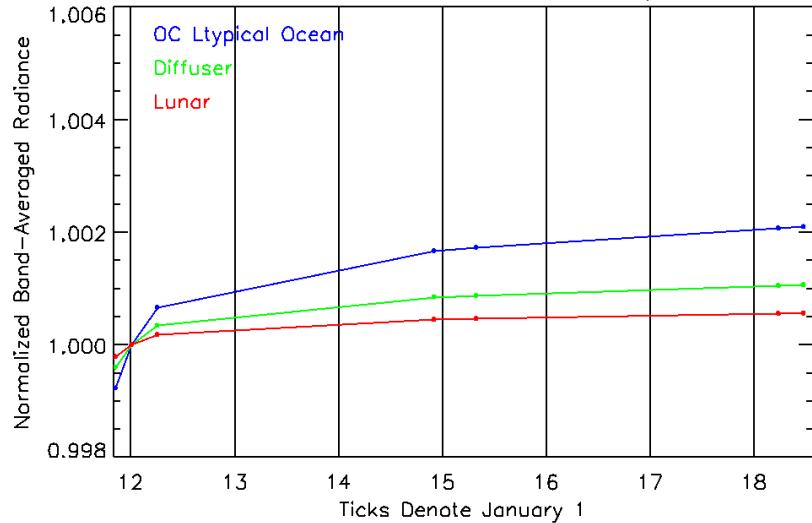


SNPP VIIRS Band M2 V10 RSR Ocean Gains

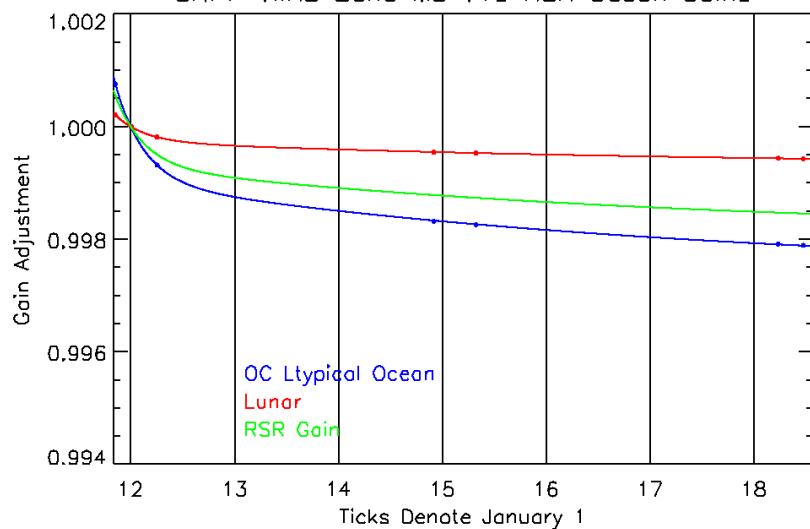


Modulated RSRs

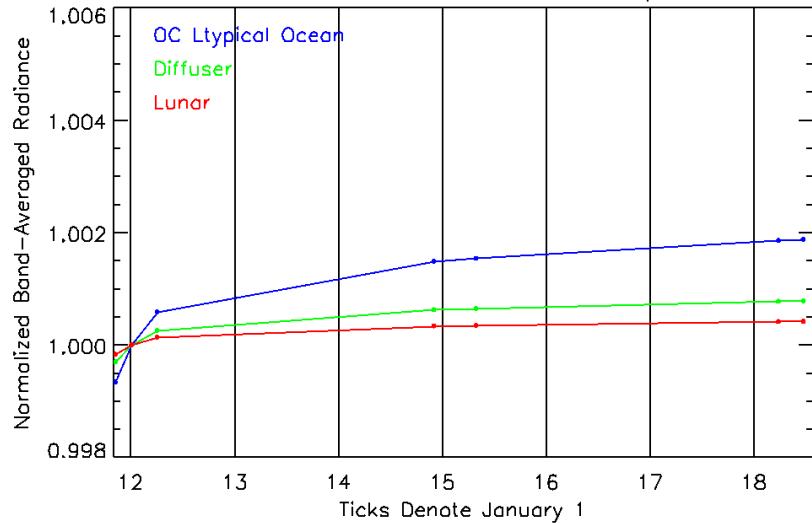
SNPP VIIRS Band M3 V10 RSR Comparisons



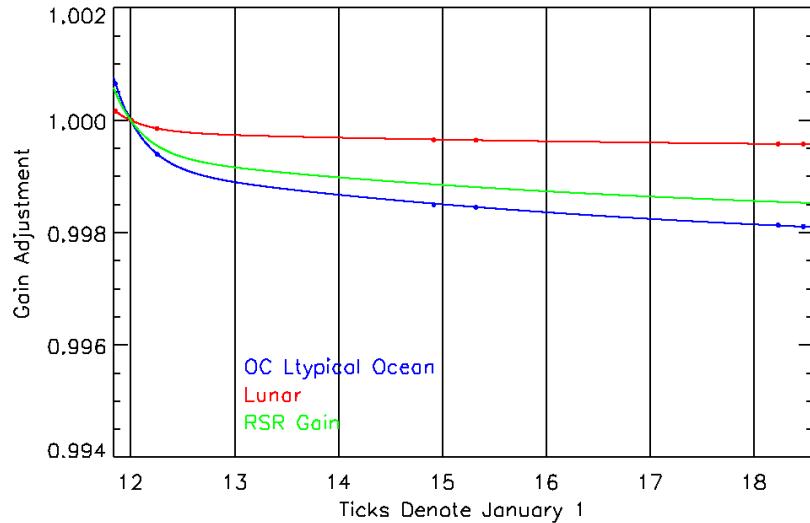
SNPP VIIRS Band M3 V10 RSR Ocean Gains



SNPP VIIRS Band M4 V10 RSR Comparisons

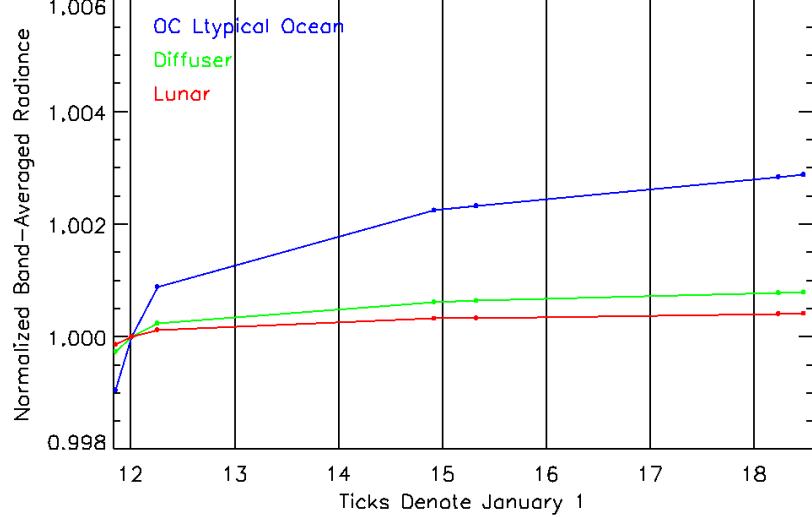


SNPP VIIRS Band M4 V10 RSR Ocean Gains

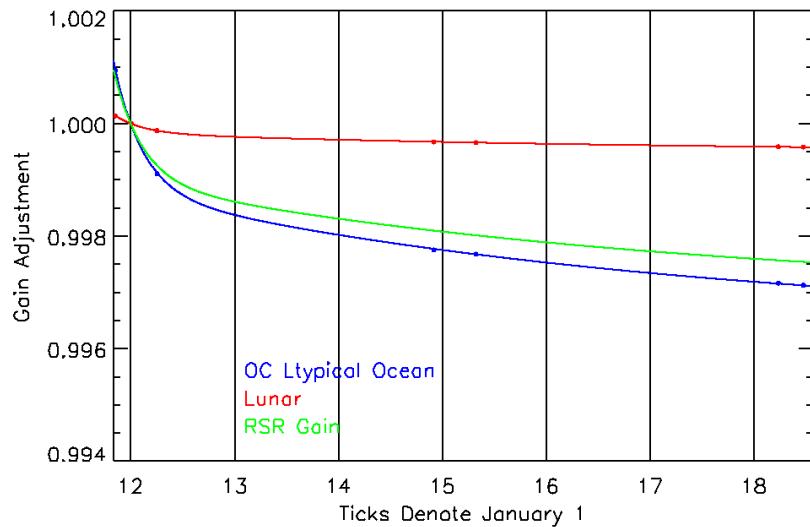


Modulated RSRs

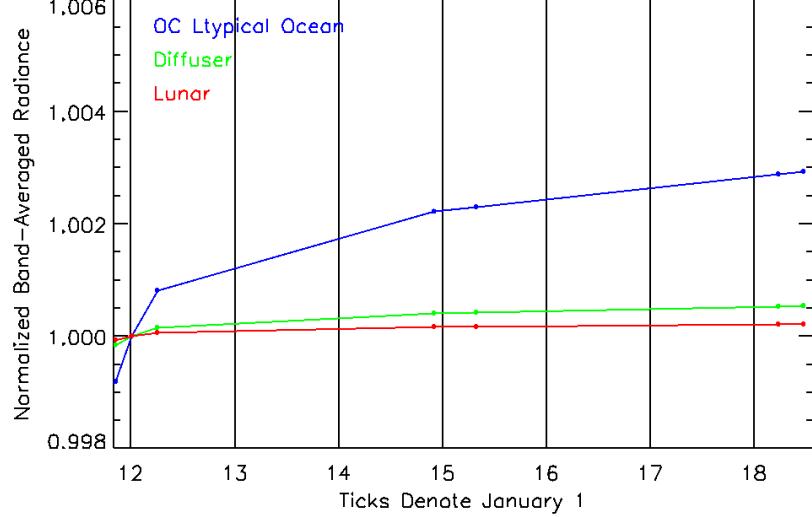
SNPP VIIRS Band M5 V10 RSR Comparisons



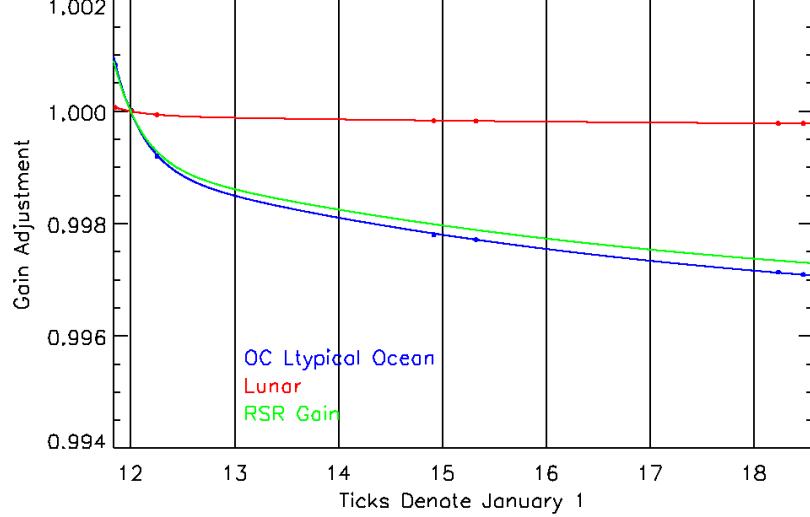
SNPP VIIRS Band M5 V10 RSR Ocean Gains



SNPP VIIRS Band M6 V10 RSR Comparisons

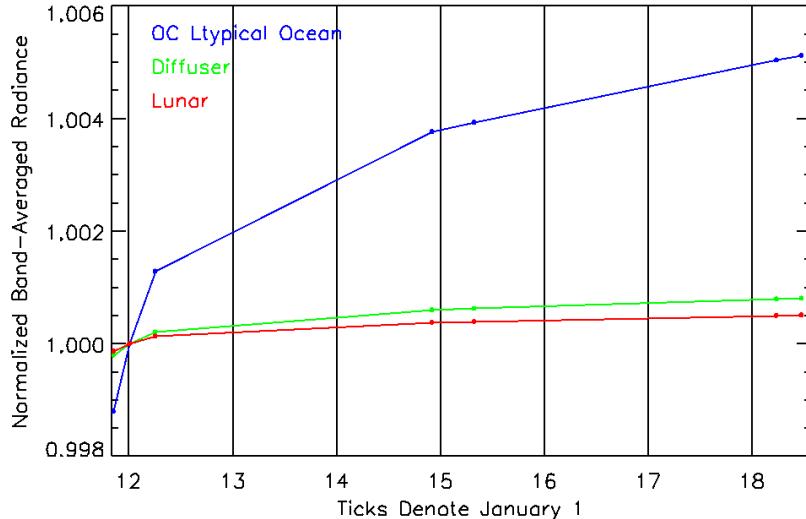


SNPP VIIRS Band M6 V10 RSR Ocean Gains

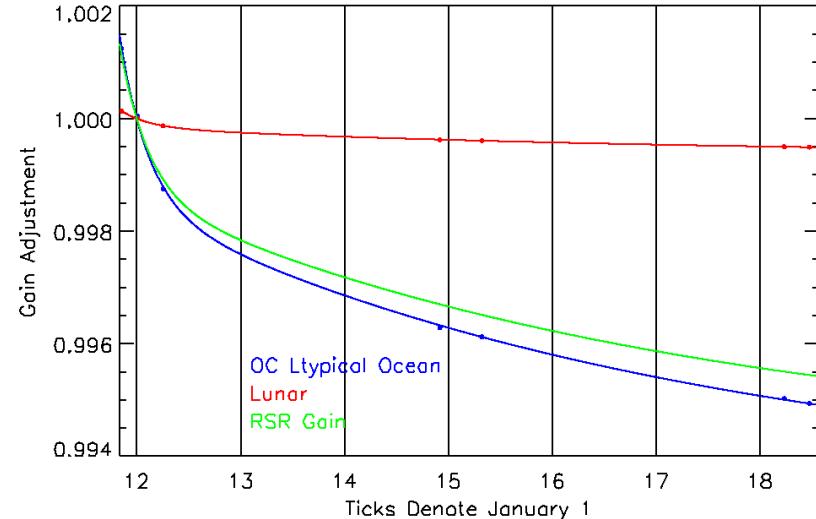


Modulated RSRs

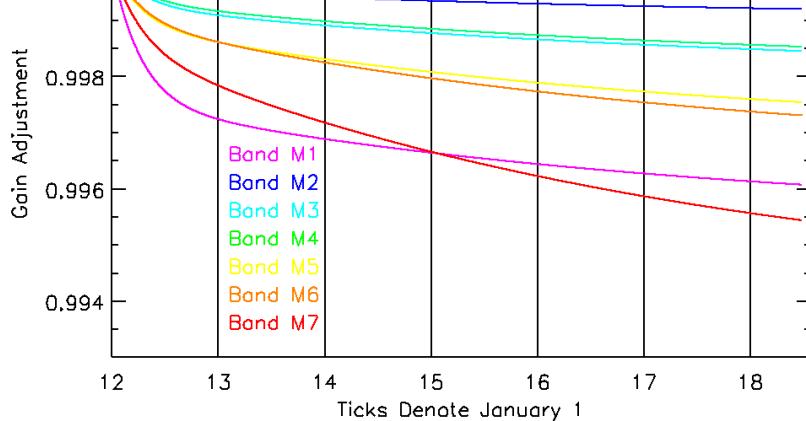
SNPP VIIRS Band M7 V10 RSR Comparisons



SNPP VIIRS Band M7 V10 RSR Ocean Gains

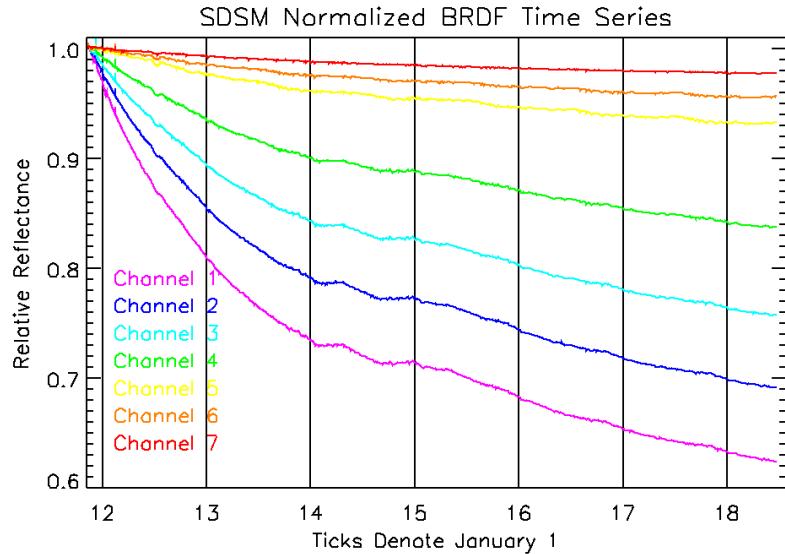


SNPP VIIRS RSR Ocean Gains



Data Processing Summary

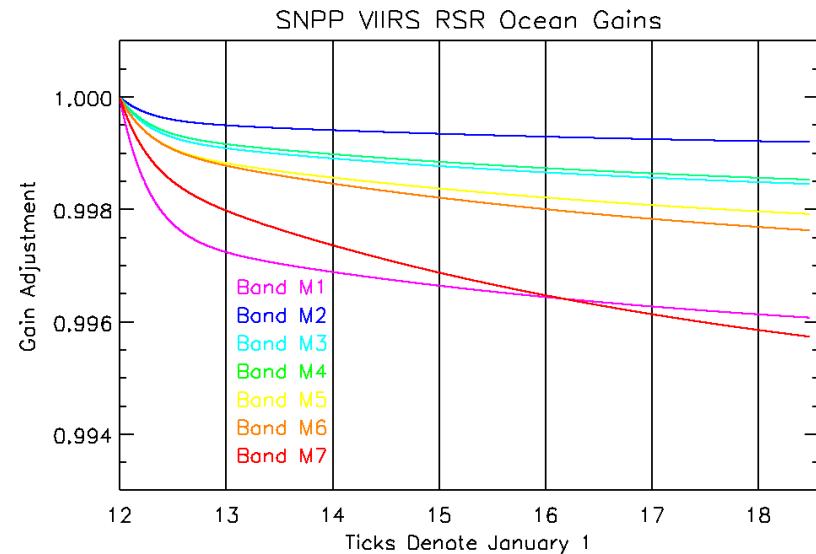
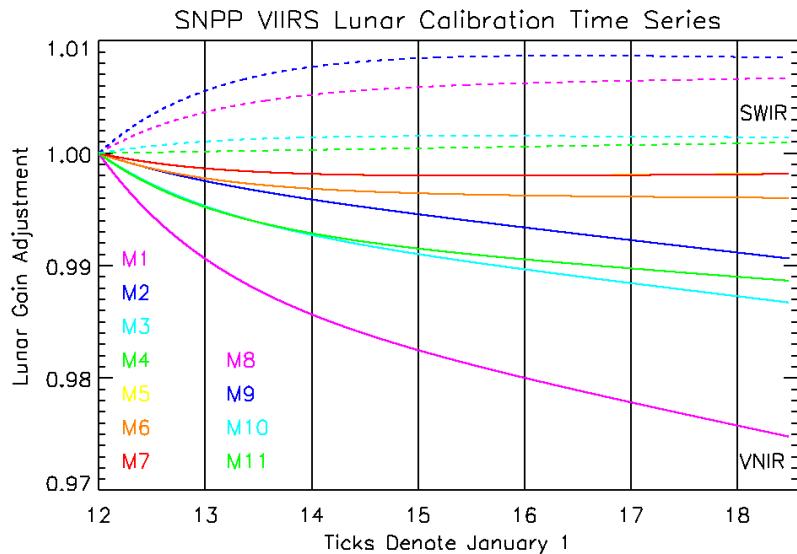
SNPP VIIRS Gain Adjustments



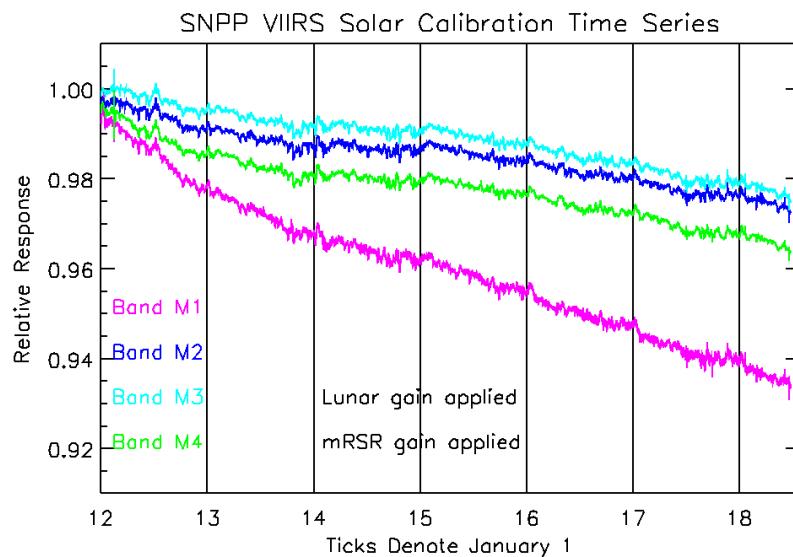
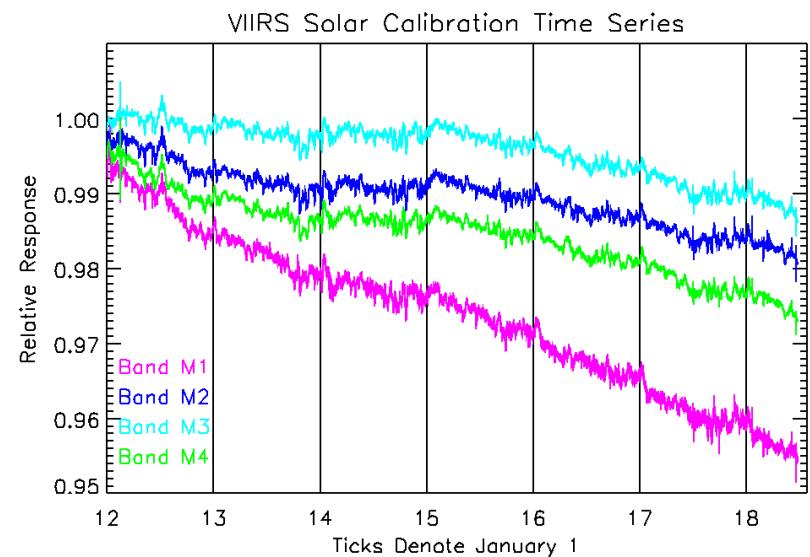
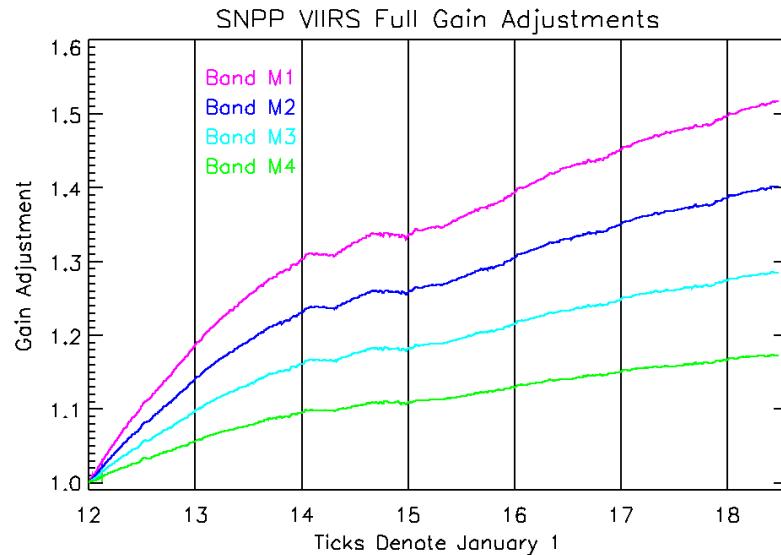
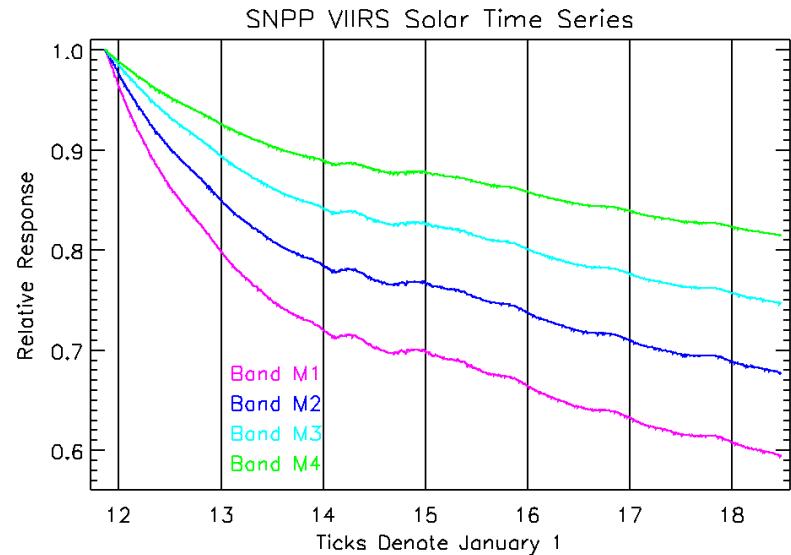
BRDF Correction of 2-36%

Lunar Adjustment of 0.1-2.5%

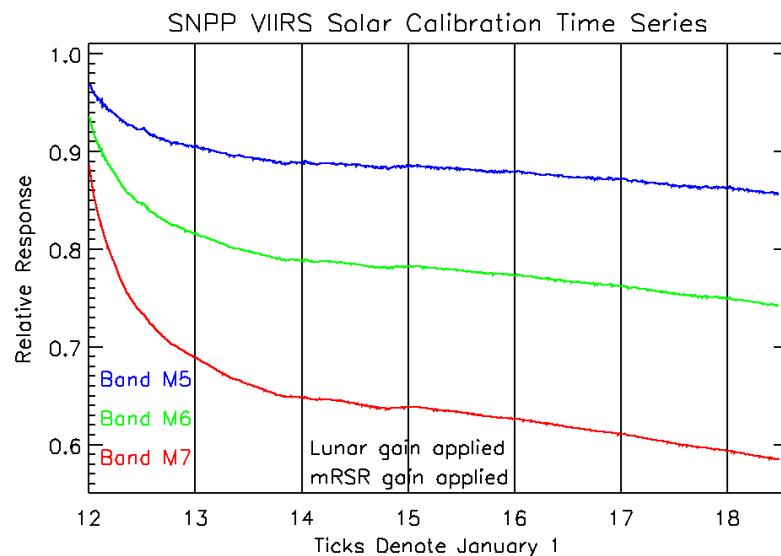
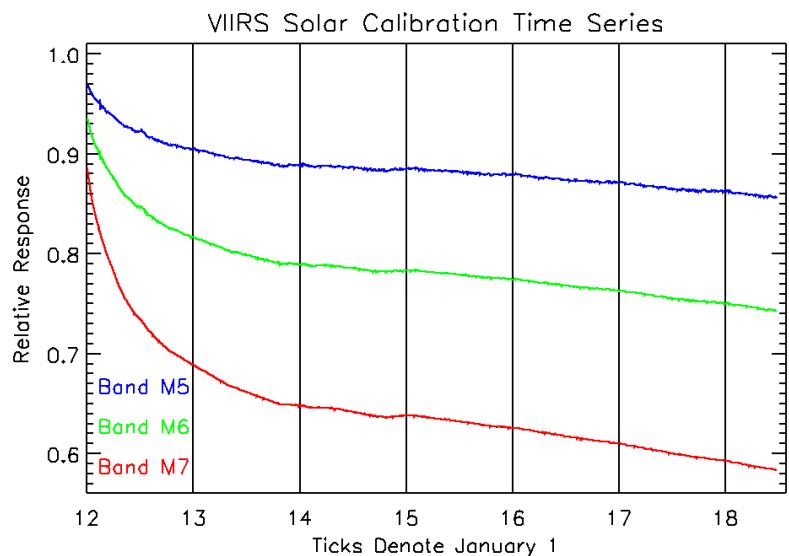
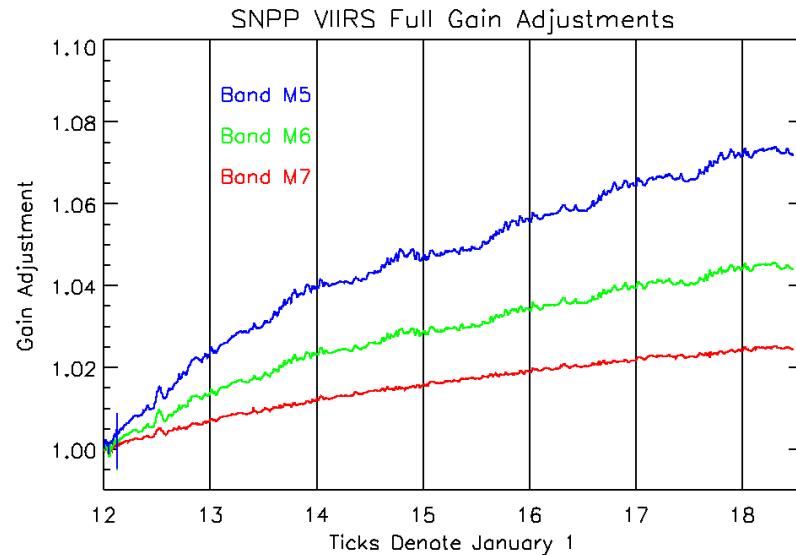
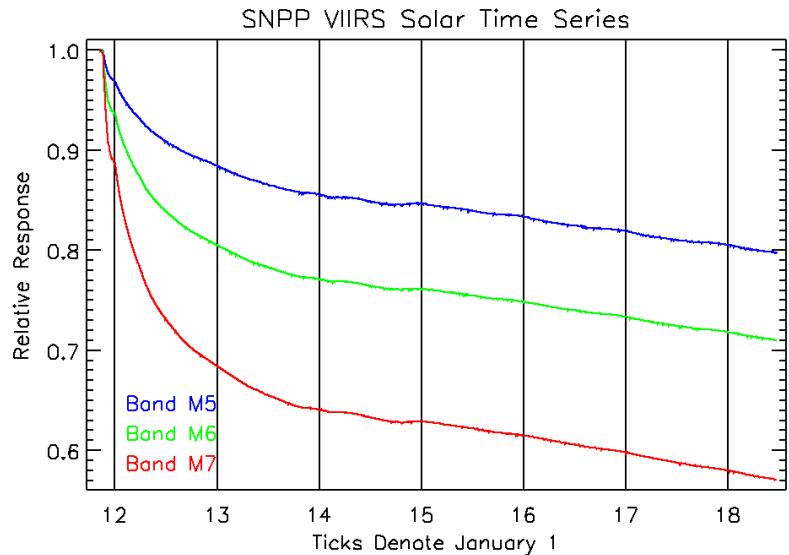
Modulated RSR Adjustment of 0.1-0.4%



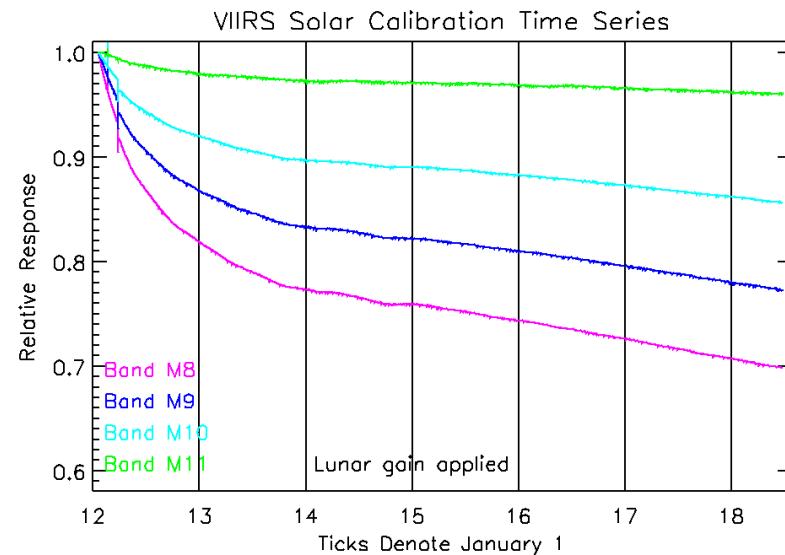
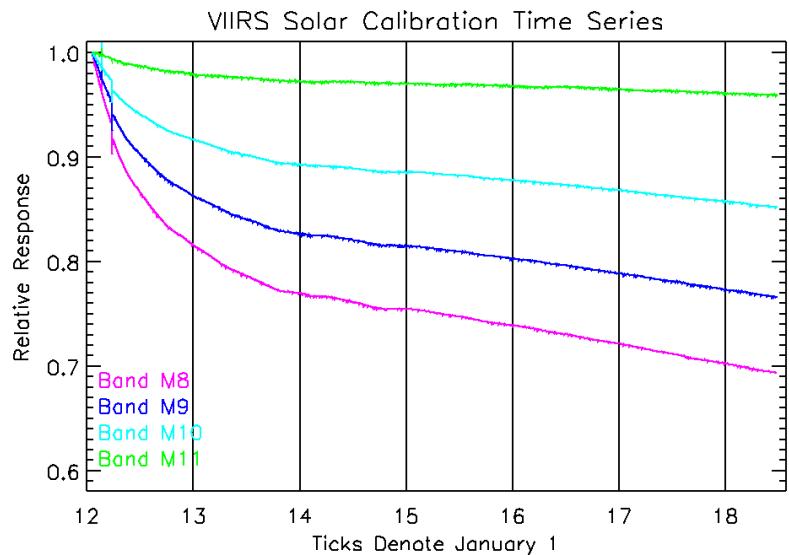
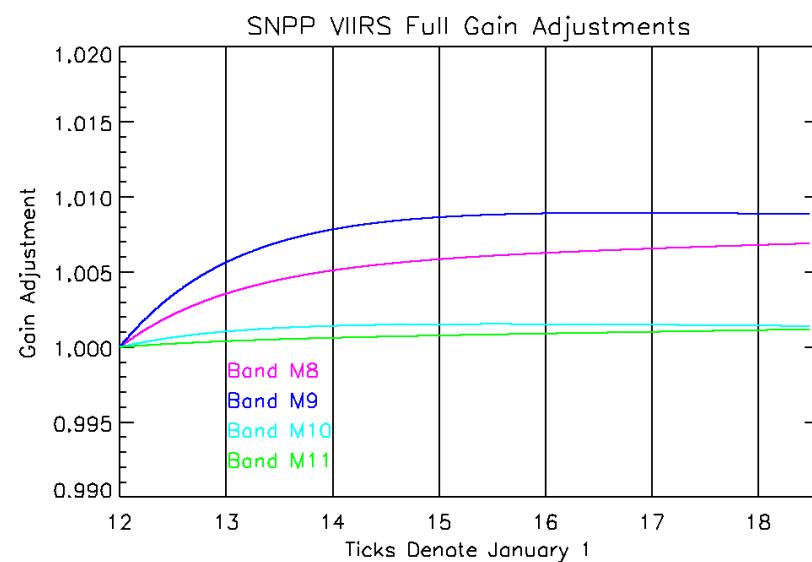
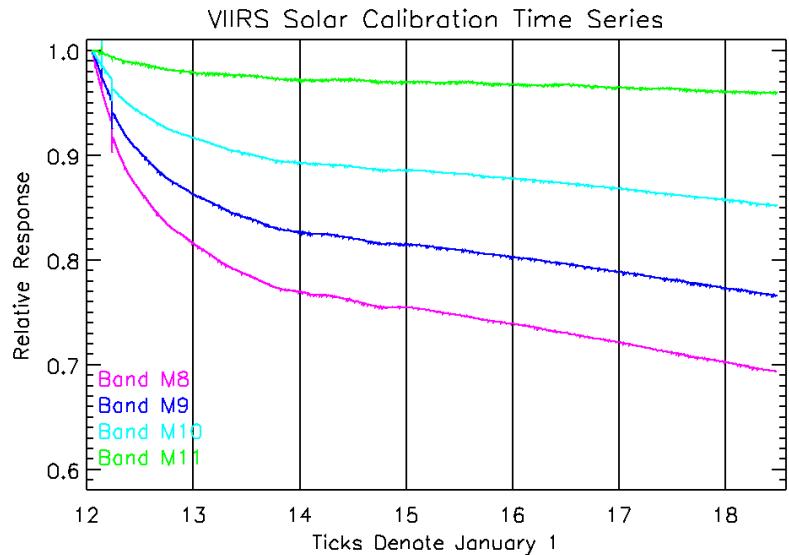
Solar Responses for Bands M1-M4



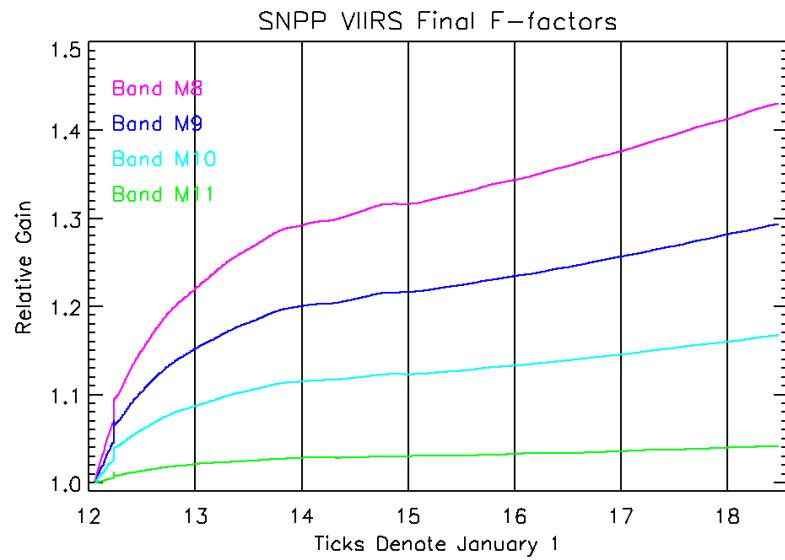
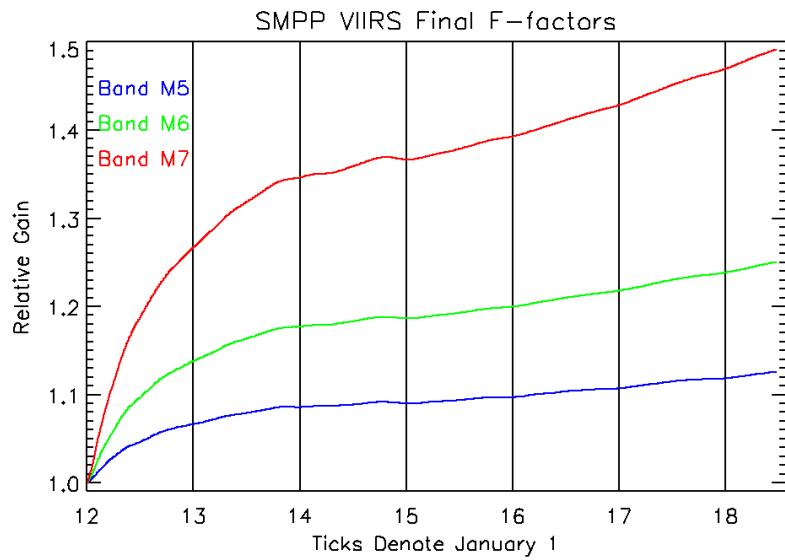
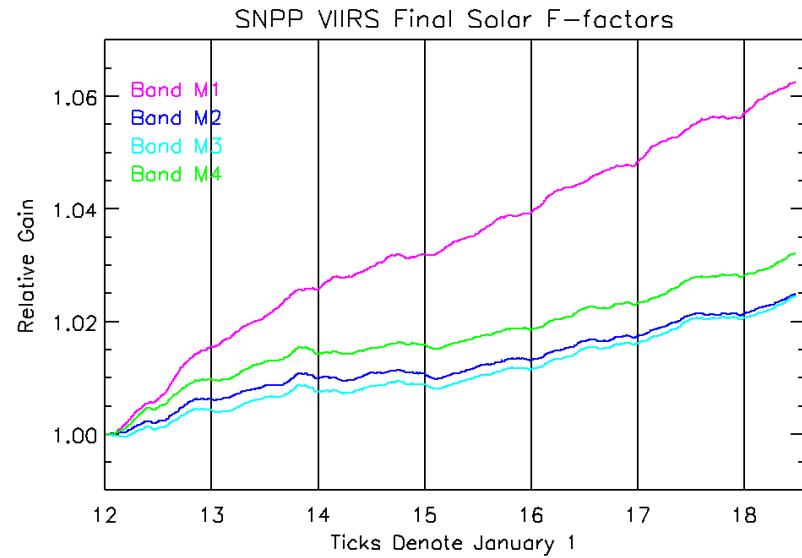
Solar Responses for bands M5-M7



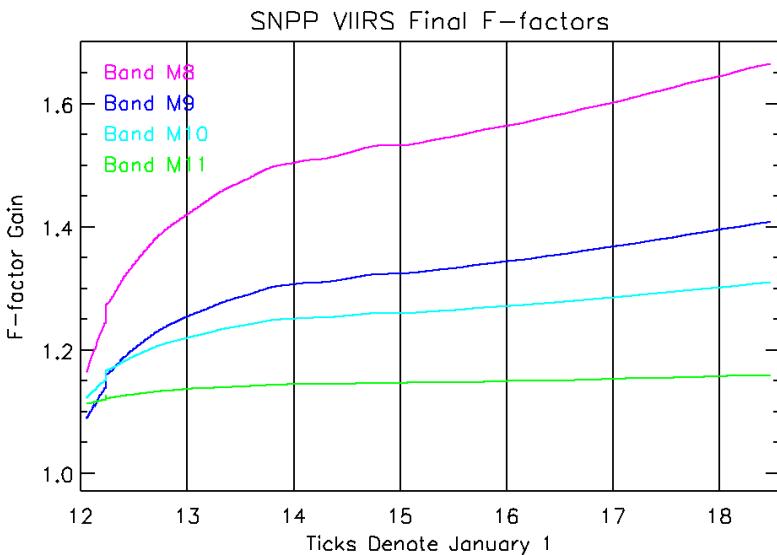
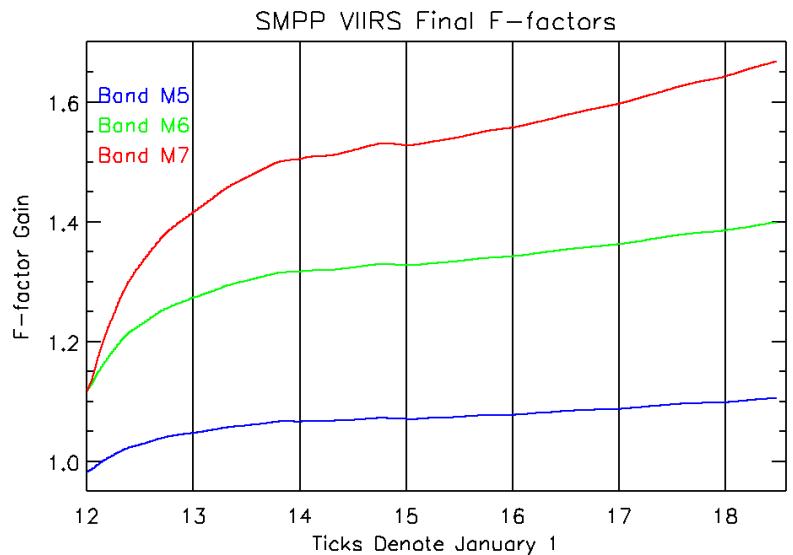
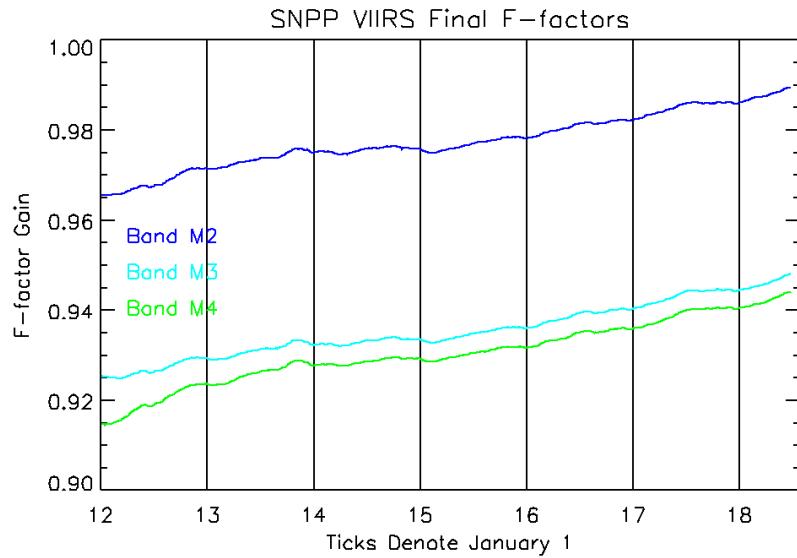
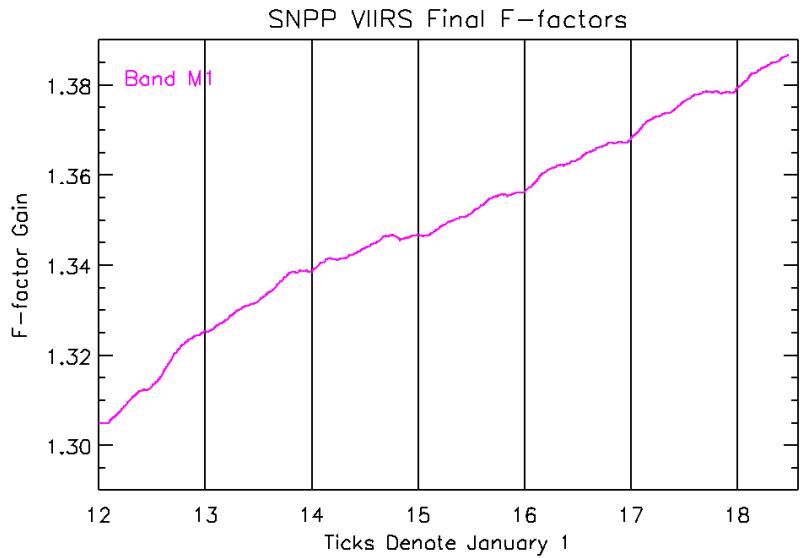
Solar Responses for Bands M8-M11



Final Relative Solar F-factors



Final Absolute Solar F-factors



SNPP VIIRS Periodic Corrections (%)

Band	Wavelength (nm)	Beta Angle Corr Min	Beta Angle Corr Max	Libration Corr Min	Libration Corr Max
M1	412	-0.388	+0.303	-0.412	+0.474
M2	445	-0.281	+0.220	-0.435	+0.420
M3	488	-0.208	+0.163	-0.415	+0.366
M4	555	-0.190	+0.148	-0.399	+0.354
M5	672	-0.356	+0.278	-0.409	+0.333
M6	746	-0.202	+0.158	-0.399	+0.343
M7	865	-0.0833	+0.0651	-0.270	+0.270
M8	1240	-0.0402	+0.0314	-0.433	+0.420
M9	1378	-0.0362	+0.0283	-0.463	+0.380
M10	1610	-0.0343	+0.0268	-0.556	+0.516
M11	2250	-0.0524	+0.0735	-0.527	+0.504

SNPP VIIRS Gain Corrections (%)

Band	Wavelength (nm)	Initial Solar	SDSM H-factor	BRDF corr Solar	Lunar Gain	RSR Gain	Final Solar
M1	412	-37.09	-35.66	-3.600	-2.521	-0.3926	-5.767
M2	445	-29.87	-29.35	-1.290	-0.9363	-0.0801	-2.132
M3	488	-23.82	-23.15	-0.937	-1.328	-0.1546	-2.110
M4	555	-17.20	-15.61	-1.729	-1.134	-0.1469	-2.703
M5	672	-17.06	-6.657	-10.93	-0.1798	-0.2458	-10.77
M6	746	-23.42	-4.353	-19.80	-0.3975	-0.2692	-19.86
M7	865	-34.45	-2.240	-32.88	-0.1839	-0.4559	-33.40
C8	935	-	-1.830	-	-	-	-
M8	1240	-32.09	-	-32.09	+0.6679	-	-32.30
M9	1378	-24.97	-	-24.97	+0.8510	-	-24.37
M10	1610	-15.71	-	-15.71	+0.1409	-	-15.92
M11	2250	-4.709	-	-4.709	+0.09444	-	-4.439